REMARKS

In the final Office Action, the Examiner rejects claims 1, 3-4, 8, 16-17, 22-26 and 36-40 under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. (U.S. Patent No. 6,721,371) in view of PATEL et al. (U.S. Patent Application Publication No. 2004/0213358); rejects claims 5-7, 13, 27-29 and 33 under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., and further in view of QUIGLEY et al. (U.S. Patent No. 6,650,624); rejects claims 14-15 and 34-35 under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., further in view of QUIGLEY et al., and in further view of PEYROVIAN (U.S. Patent No. 5,768,682); and rejects claims 9-10, 12 and 30-32 under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., further in view of QUIGLEY et al., and in further view of the Applicant's admitted prior art in Fig 17 (A).

Claims 1, 3-10, 12-17, and 22-40 remain pending in the present application. All claims are patentable over the prior art of record for at least the reasons set forth in detail below. Accordingly, reconsideration and timely allowance of claims 1, 3-10, 12-17, and 22-40 are respectively requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 1, 3-4, 8, 16-17, 22-26 and 36-40 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. (U.S. Patent No. 6,721,371) in view of PATEL et al. (U.S. Patent Application Publication No. 2004/0213358). Applicant respectfully traverses.

Claim 1 recites a method of demodulating multiple channels, including providing a first analog to digital converter having an analog input and a digital output; providing a first plurality of digital demodulators, each demodulator having a programmable center frequency; coupling a band of frequencies to the analog input of the first converter, the band including a first plurality of channels; creating digitized samples of the band at the output of the first converter; coupling the digitized samples to the plurality of demodulators; demodulating a second plurality of channels from the band of frequencies; maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths; selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator. The combination of BARHAM et al. and PATEL et al. does not disclose or suggest the combination of features recited in claim 1.

For example, BARHAM et al. and PATEL et al., whether taken alone or in any reasonable combination, do not disclose or reasonably suggest maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the filter coefficients associated with the

first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator, as recited in claim 1. In making the rejection, the Examiner acknowledges that BARHAM et al. does not disclose these features and relies on paragraphs 0050, 0051, and 0055 for allegedly disclosing using pre-stored filter coefficients in nonvolatile storage (Final Office Action – pp. 5-6). Moreover, in responding to Applicant's prior arguments, the Examiner alleges that col. 4, line 11 to col. 6, line 63 of BARHAM et al. discloses multiple programmable digital filters and that it would have been obvious to one or ordinary skill in the art at the time of the invention to have combined the filter coefficients of PATEL et al. with the system of BARHAM et al. for the advantage of having pre-computed sets of filter coefficients in non-volatile storage in order to reduce the amount of processing time and delays which may occur when using digital filters (final Office Action – pg. 3). Applicant respectfully disagrees.

As an initial matter, Applicant respectfully disagrees with the Examiner's re-characterization of his prior Rejection. Pages 3-4 of the Office Action dated September 19, 2006, as well as pages 5-6 of the final Office Action clearly indicate that BARHAM et al. does not disclose the claimed maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths; selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the filter coefficients associated with the first bandpass

bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator. The Examiner clearly relies on the disclosure of paragraphs 0050, 0051, and 0055 of PATEL et al. for allegedly disclosing or at least rendering obvious each of these features. Nowhere in the initial rejection of claim 1, or in the present rejection of claim 1, does the Examiner allege that any portion of BARHAM et al. discloses these features. In fact, other than in his response to Applicant's prior rejections, the Examiner does not indicate that BARHAM et al. even discloses a digital filter, let alone the combination of features recited in claim 1 relating to digital filters. For at least this reason, Applicant submits that the finality of the present rejection is improper.

At col. 4, line 11 to col. 6, line 63, BARHAM et al. discloses a high speed demodulator system that includes a number of IC demodulators (RADIS 10) used for acquiring and demodulating radio data communications. Each RADIS 10 is programmable with weight values and may be used to demodulate spread spectrum systems such as code division multiple access and time division multiple access systems. Received analog signals (I, Q) are digitized by an ADC 122 and sent to a demodulator 123. Each RADIS 10 includes a reconfigurable finite impulse response (FIR) filter 14 that is configurable by receiving FIR weights from an external controller (col. 5, lines 31-34). The FIR filter 14 includes 64 stages implemented with 32 1-bit taps. A set of registers forming a weight stack or ring 16 (8x34) is connected to the parallel input port for being programmed from the external processor. The output of the weight ring 16 is a

set of tap weights which are input to the reconfigurable FIR filter 14. The output of FIR filter 14 is applied to a phase adjustment block 22 and a first input of an adder 24. BARHAM et al. does not disclose or suggest multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths; selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator, as recited in claim 1.

At paragraphs 0050 and 0051, PATEL et al. discloses:

> A digital multiplexer 236 responds to the pilot carrier presence detector 34 detecting pilot carrier accompanying the received HDTV signal, which is indicative that the received HDTV signal is a VSB signal, to select the real samples of this signal supplied from a VSB in-phase synchronous detector 290 for application to a bandpass FIR digital filter 237 that provides a selective response centered at 10.76 MHz, which selects the 10.76 MHz symbol frequency of the VSB signal. The filter 237 response is squared by a digital multiplier 238, which multiplier 238 can either be constructed from logic gates or provided by a ROM storing a look-up table of squares. The product output signal from the digital multiplier 238 operated to square samples has a strong component at the second harmonic of the 10.76 MHz component of the filter 237 response, and a bandpass FIR digital filter 239 that provides a selective response centered at 21.52 MHz selects this second harmonic for application to the DAC 232 as its digital input signal descriptive of its 21.52 MHz reference carrier analog output signal.
>
> The digital multiplexer 236 responds to the pilot carrier presence detector 34 not detecting pilot carrier accompanying the received HDTV signal, which is indicative that the received HDTV signal is a QAM signal, to select the product output signal of a digital multiplier 23A for application to the bandpass filter 237 that provides a selective response centered at 10.76 MHz. The digital multiplier 23A, which multiplier 23A can either be constructed from logic gates or provided by a ROM storing a look-up

> table of squares, squares the samples supplied from a bandpass FIR digital filter 23B that provides a selective response centered at 5.38 MHz, which selects the 5.38 MHz symbol frequency of a baseband QAM signal. This baseband QAM signal can be supplied either from a QAM in-phase synchronous detector 250, as shown in FIG. 3, or from a QAM quadrature-phase synchronous detector 255, as shown in FIG. 5.

This section of PATEL et al. discloses that received VSB HDTV signals are filtered around 10.76 MHz by bandpass filter (BPF) 237, with the output of filter 237 squared by multiplier 238 to generate a signal around 21.52 MHz, a second BPF filter 239 for passing 21.52 MHz is then applied to form an output signal to digital to analog converter (DAC) 232. Conversely, if the received signal is a QAM HDTV signal, the received signal is initially filtered by BPF 238 around 5.27 MHz. The filtered signal is then squared by multiplier 23A to generate a 10.76 MHz signal. This signal is then processed in the same manner as a VSB signal. This section of PATEL et al. further discloses that multipliers 238 and 23A may be stored in a ROM.

Contrary to the Examiner's position, this section of PATEL et al. does not disclose, either alone or in any reasonable combination with the disclosure of BARHAM et al., maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths, as required by claim 1. Rather, the filter coefficients for each of filters 236, 238, and 239 are preset in their respective filters and are not retrieved from non-volatile storage. This follows from the fact that each filter in PATEL et al. is configured to pass only a particular bandwidth and is not dynamically configurable.

At paragraph 0055, PATEL et al. discloses:

> The samples from the in-phase synchronous detector 290 applied as input signal to the clocked digital delay line 323 are applied without delay as input signal to a mean-square-error gradient detection filter 326. The filter 326 is a finite-impulse-response digital filter having a (-1/2), 1, 0, (-1), (+1/2) kernel, the operation of which is clocked by the first sampling clock. The prescribed number of sample periods of delay provided by the clocked digital delay line 323 is such that filter 326 response is in temporal alignment with the difference signal from the adder/subtractor 325. A digital multiplier 327 multiplies the difference signal from the adder/subtractor 325 by the filter 326 response to resolve this issue. The sign bit and the next most significant bit of the two's complement filter 326 response suffice for the multiplication, which permits simplification of the digital multiplier 327 structure. The samples of the product signal from the digital multiplier 327 are indications of the misphasing of the symbol clocking done at the receiver that are averaged over many samples (e. g., several million) by a digital lowpass filter 328 for generating the second address correction signal supplied to the adder 322 to correct the basic second address.

This section of PATEL et al. discloses that received VSB signals may be applied without delay to a gradient detection filter 326. Filter 326 is a finite-impulse-response digital filter having a (-1/2), 1, 0, (-1), (+1/2) kernel, the operation of which is clocked by the first sampling clock. Filter 326 is not adjusted based on pre-computed sets of filter coefficients maintained in non-volatile storage, with each set corresponding to one of multiple low-pass digital filters, and each filter having one of a predetermined set of bandwidths, as would be required by claim 1.

For at least the above reasons, claim 1 is patentable over the cited combination of BARHAM et al. and PATEL et al. Reconsideration and allowance of claim 1 are respectfully requested.

Claims 3, 4, 8, 16, 17, 22, 23, and 38 depend from claim 1. Accordingly, these claims are patentable over the combination of BARHAM et al. and PATEL et al. for at

least the reasons set forth above with respect to claim 1. Moreover, these claims are patentable for reasons of their own.

For example, claim 3 recites loading the coefficient latches in the first demodulator with transformed coefficients corresponding to a second center frequency. Neither BARHAM et al. nor PATEL et al. disclose or suggest this feature of claim 3. In making the rejection, the Examiner relies on col. 3, line 43 - col. 6, line 67 of BARHAM et al. for allegedly disclosing programmable demodulators having reconfigurable FIR filters (final Office Action – pg. 6). Applicant respectfully disagrees.

The cited section of BARHAM et al. discloses an array of programmable demodulators 10. However, as noted-above, the Examiner acknowledges that BARHAM et al. does not disclose maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of multiple low-pass digital filters, each filter having one of a predetermined set of bandwidths; selecting a first center frequency and first bandpass bandwidth for provisioning a first one of the first plurality of demodulators; retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator (final Office Action – pp. 4-5).

Accordingly, because BARHAM et al. does not disclose retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the first demodulator,

BARHAM et al. similarly cannot disclose or suggest loading the coefficient latches in the first demodulator with transformed coefficients corresponding to a second center frequency, as required by claim 3. Although BARHAM et al. discloses reconfigurable FIR filters, BARHAM et al. does not disclose or even remotely suggest loading the coefficient latches in the first demodulator with transformed coefficients corresponding to a second center frequency, as required by claim 3. For the reasons described above, PATEL et al. does not remedy this deficiency. Claim 3 is therefore patentable over BARHAM et al. and PATEL et al. for at least these additional reasons. Reconsideration and allowance of claim 3 are respectfully requested.

Independent claim 24 recites features similar to (yet potentially different in scope from) claim 1. Accordingly, claim 24 is patentable over BARHAM et al. and PATEL et al. for at least reasons similar to those set forth above with respect to claim 1. Reconsideration and allowance of claim 1 are therefore respectfully requested.

Claims 25, 26, 36, 37, 39, and 40 depend from claim 24 and are, therefore, patentable over BARHAM et al. and PATEL et al. for at least the reasons set forth above with respect to claim 24. Reconsideration and allowance of claims 25, 26, 36, 37, 39, and 40 are therefore respectfully requested.

Claims 5-7, 13, 27-29, and 33 have been rejected under 35 U.S.C. § 103(a) as being unpatentable BARHAM et al. in view of PATEL et al., and further in view of QUIGLEY et al. Applicant respectfully traverses.

Claims 5-7 and 13 depend from claim 1. The disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosure of BARHAM et al. and PATEL et al. set

forth above with respect to claim 1. Therefore, Applicant submits that claims 5-7 and 13 are patentable over BARHAM et al. and PATEL et al., whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 1.

Claims 27-29 and 33 depend from claim 24. The disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosure of BARHAM et al. and PATEL et al. set forth above with respect to claim 24. Therefore, Applicant submits that claims 27-29 and 33 are patentable over BARHAM et al. and PATEL et al., whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 24.

Claims 14, 15, 34, and 35 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., in further view of QUIGLEY et al., and in further view of PEYROVIAN. Applicant respectfully traverses.

Claims 14 and 15 depend from claim 5. The disclosure of PEYROVIAN does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 5. Therefore, Applicant submits that claims 14 and 15 are patentable over BARHAM et al., PATEL et al., QUIGLEY et al. and PEYROVIAN, whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 5.

Claims 34 and 35 depend from claim 27. The disclosure of PEYROVIAN does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 27. Therefore, Applicant submits that claims 34 and 35 are patentable over BARHAM et al., PATEL et al., QUIGLEY et

al., and PEYROVIAN, whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 27.

Claims 9, 10, 12, and 30-32 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over BARHAM et al. in view of PATEL et al., further in view of QUIGLEY et al., and in further view of the Applicant's allegedly admitted prior art in Fig. 17(A). Applicant respectfully traverses.

Claims 9, 10, and 12 depend from claim 5. Applicant's Fig. 17(A) does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 5. Therefore, Applicant submits that claims 9, 10, and 12 are patentable over BARHAM et al., PATEL et al., QUIGLEY et al. and Applicant's Fig. 17(A), whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 5.

Claims 30-32 depend from claim 27. Applicant's Fig. 17(A) does not remedy the deficiencies in the disclosure of BARHAM et al., PATEL et al., and QUIGLEY et al. set forth above with respect to claim 27. Therefore, Applicant submits that claims 30-32 are patentable over BARHAM et al., PATEL et al., QUIGLEY et al., and Applicant's Fig. 17(A) whether taken alone or in any reasonable combination, for at least the reasons given above with respect to claim 27.

Conclusion

In view of the foregoing remarks, the Applicant respectfully requests withdrawal of the outstanding rejection and the timely allowance of this application. In the event that the application is not believed to be in condition for allowance, the Examiner is invited to

contact Applicant's representative at the number shown below to expedite prosecution of this application.

As Applicant's remarks with respect to the Examiner's rejections are sufficient to overcome these rejections, Applicant's silence as to assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, etc.) is not a concession by Applicant that such assertions are accurate or such requirements have been met, and Applicant reserves the right to analyze and dispute such assertions/requirements in the future.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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